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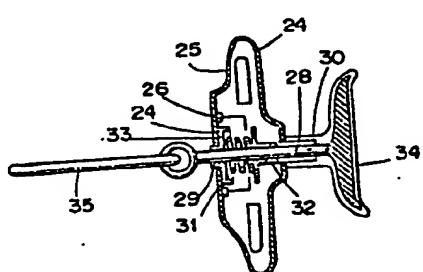
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54 Nipple for stimulation of buccal motions of infants.

57 The rigid front part (24) forms a vestibular screen which engages between the gum buds and the lips of an infant. Disc part (33) is integral with the sliding bar (28) and moves axially against the biasing force of the spring (31). The micro switch (26) closes upon that axial movement and starts the emission of a sound, taste, or smell signal. Displacement of the moving portion (33, 28) may be caused by an effort of the tongue exerted onto the rear surface of the disc (33) or by a traction exerted onto the front ring (35).

FIG. 3



EP 0 199 005 A1

Nipple for stimulation of buccal motions of infants.

There is already known, especially through US Patent No. 3,115,139 a nipple fitted with auxiliary elements meant to produce certain particular effects, either during the use of the nipple or when same is set to use. The above-mentioned US Patent divulges, for example, a nipple comprising a vibratory teething device.

However, until now, it was not known to provide a nipple for the purpose of rendering easier and of improving the oral kinesthesia of nursing infants.

The present invention, on the contrary, has as its purpose to provide a nipple conceived from the perspective of that problem, and applicable more particularly to false nipples such as the "suckers" used for the stimulation of buccal motions outside of feeding times.

In case of a quantitative deficit of mother's milk, the breast generally is replaced with a bottle and artificial milk.

Bottle feeding, which frees the mother, causes in the nursing infant a reduction of the gnostic and sensorial capabilities of his buccal cavity. Tactile reciprocity, which refines the buccal perception of the new-born is non-existent.

Breast feeding makes it possible for the child, while granting nutritional pleasure and satiety, to familiarize the child's buccal mucous membrane with the maternal epidermal sensitivity and with the erection of the teat. That physiological reaction of the mother, perfectly felt by the child, develops its tactile sense simultaneously with its gustatory sense. The secondary reflexes thus started will, completing

5 the inborn suction-swallowing refl x, help the neuro-motor apprenticeship and help the establishing of a balanced oro-facial behavior. In bottle feeding, little attention has been paid to the nipple used, and to its substitute between feedings, which the sucker represents.

10 In the neuro-sensorial and stereognostic development of the child, however, those devices are essential since they establish the first contacts of the mouth with the external environment, and must make possible the first tactile stimulations of the buccal cavity.

15 Various epidemiological studies on the oral behavior habits have revealed a sensorial deficiency and a stereognostic incapacity in thumb sucker and tongue pulser children. The majority of those children had, in their antecedents, a persistent bottle feeding and they presented anomalies in dental and maxillary positions.

20 The hypothesis of an association between neuro-sensoro-motor maturing, the tactile search with the mother and the poor dental-maxillary positions could not be rejected.

25 The present invention rests on the preceding considerations, and has as its object to provide a nipple for the stimulation of buccal motions of infants and comprising a base portion a teat portion and electric switch means able to activate a response device upon a deformation imparted to said teat portion, characterized in that said electric switch means comprise an elastically deformable member able to undergo a progressive deformation in response to a progressively increasing effort exerted by an inner portion of the buccal cavity of the infant and electric contact elements arranged for closing or opening an

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electric circuit when said deformable member has performed said progressive deformation, said response device being activated by said circuit and being able to provide a light, sound taste or smell emission 5 perceptible by the infant.

It will be seen below, various forms of execution of that invention may be developed.

10 A few preferred embodiments of the invention are described below, as example only, and with reference to the attached drawing in which:

Figures 1 and 2 are section views, respectively in the horizontal and in the vertical plane, of a first form of the invention, and

15 Figure 3 is a section view of a second form of the invention.

20 The nipple represented in Figures 1 and 2 is developed in a manner such that the effect of a buccal motion which is different from the suction motion is perceptible by the infant in a manner different than by the reaction of the element on which the starting motion is exerted.

25 That false nipple comprises a ring-shaped base of relatively rigid plastic material 12, comprising a central passage 13 which is closed by a rear plate 14. Inside ring-shaped base 12 there is lodged a device 15 capable of producing an emission perceptible by the nursing infant. Generally speaking, that emission may 30 be of any type: visual, olfactory, gustatory or auditory. Thus, for example, device 15 might comprise a miniature music box work, or a musical module of the entirely electronic type, which can be connected and disconnected by a switch, and maintained by a miniature battery. In the form of execution represented in Figures 1 and 2, the complex formed by that device,

which is ring-shaped is lodged inside a closed and tight casing 15a. Only two connections 16 and 17, meant to be connected to the switch, come out of that casing. The latter may be affixed, for example, to the rear wall 14 of the object.

5 The two connection wires 16 and 17 are connected to the contacts of a switch which is meant to be engaged and disengaged under the action of buccal motions such as a pressure of the infant's tongue on a rigid or semi-rigid element lodged inside his mouth.

10 In the embodiment of the invention represented in Figures 1 and 2, the ring-shaped support 12 is extended by a flexible and elastic membrane 18 which imitates the shape of the teat of a nipple. In
15 addition, the exercizer lodged inside that teat is, in this case, a cylindrical bar 19 made of a semi-rigid material, a zone 19a of which is arranged so that it becomes conductive under the action of a mechanical solicitation. Bar 19 may be of rubber, for example, zone 19a being executed in a manner well known in
20 itself, with incorporation of fine particles of copper buried in the mass of the rubber so that, under the action of a contraction, the particles come in mutual contact and zone 19a thus becomes conductive. As seen
25 in Figures 1 and 2, two conductor rings 20 and 21 are further mounted around bar 19, at both ends of zone 19a, and the connection wires 16 and 17 are connected to those rings.

30 Of course, it would also be possible to imagine the exercizer 19 in another form, for example that of a construction comprising two rigid sections articulated to each other or coupled to each other, and held by means of springs for example, in a rectilinear position when the exercizer is at rest. The latter

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still could be arranged so as to react to more or less complex and laborate motions. Thus, in an advantageous form of execution, instead of being constituted in the form of a semi-flexible bar, it could consist of an 5 elastically extensible linear arrangment which however is normally kept rigid by an external sheath, said sheath being put out of action and unblocking a flexion motion following an extension the amplitude of which is pre-determined. With a construction of that type, the 10 response device would be set into action as a result of a buccal motion comprising the combination of a suction force causing the extension of the exercizer, and of a flexion motion imposed by the tongue.

In any case, when the nursing infant applies 15 his tongue from the bottom up under exercizer 19 (arrow D) while holding teat 18 pinched between his gum swellings which apply on the internal side of ring-shaped part 12, said exercizer is subjected to an upward deformation. Said deformation of course is felt 20 as such by the buccal muscles but, in addition, the contraction of zone 19a causes the closing of the contact and it starts the musical production of device 15.

In this embodiment of the invention, bar 19 is 25 mounted in a sliding manner inside a bearing 22 solidary of wall 14, and it presents a loop 19b at its external end, a loop to which there is hooked a traction ring 23. The infant thus can cause at will the musical emission, through a traction exerted on ring 30 23, part 12 being held back inside the mouth. But, under normal circumstances, the straightening of the end of the bar by means of the traction of the sliding rod of the ligual upward motion makes possible the start of the music. The end which can be straightened

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and a part of the sliding stem or rod are, with the sheath, covered with a rubber which allows for endo-buccal suction. The covering rubber maintains a rounded shape on its superior and lateral faces, and a flattened form on its interior face.

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In the infants attempts to find between feedings, the security-filled situation of suction pleasure, it is going to condition, through the perception of the auditive, visual, olfactive or gustatory emission of the emitting device and the simultaneous straightening of the nipple, a reflex of mandibular forward motion and of lingual propulsion.

A second embodiment of the nipple according to the invention also constitutes a false nipple. (Fig. 3). Its purpose is to exercise the lips. It is meant, for example, for children older than nursing infants, who suffer from labial hypotonicity. The rigid parts 24 constitutes a support capsule and it presents the shape of a circular disc. It plays the part of a vestibular screen which engages between the gum buds and the lips. Inside that base in the form of a casing, there is lodged the electronic device 25 of the same type as the device 15 in the preceding form of execution. The electric contact which closes to cause the musical emission is constituted, in this case, by a micro-switch 26 which may be affixed to the top or to the bottom, inside wall 27 which forms the center of membrane 24. The device further comprises a rigid bar 28 which slides in openings 20 and 30 of capsule 24, the sliding being held back by a spring 31 inserted between a disc 32 mounted on bar 28 and a fixed disc 33 placed inside wall 27. Bar 28 extends rearward by means of a second lateral element 33 in the shape of a disc which comes to insert itself inside the gum buds. A

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membrane 34 covers the rear of bar 28 and disc 33, while allowing the axial displacements of bar 28 relative to capsule 24. In that case also, a ring 35 makes it possible to execute by hand a traction on bar 28. The latter slides then in bearings 29 and 30 so that disc 32 will operate micro-switch 26.

5 In this embodiment, the vestibular screen is intended to help the child to resist the labial closing upon traction on the ring, without using the mandibular lift. The musical start signals to the child that the traction to expel the exercizer from the mouth indeed has been fought by the lips and it stimulates it to increase its effort (biofeedback phenomenon). The tongue upwardly oriented by the end of the nipple, 10 15 participates in that motion.

Other exercizers based on the same principle may be developed. For older children, it is possible to do without the endo-buccal end which can be straightened. The start of the music then may take 20 place under the action of traction alone, exerted at the level of the lips and of the vestibular screen.

C L A I M S

1. Artificial nipple for stimulating the buccal motions of infants, comprising a base portion (12;24) a teat portion (18;34) and electric switch means (19a; 26) able to activate a response device upon a deformation imparted to said teat portion,
5 characterized in that said electric switch means comprise an elastically deformable member (19a; 31) able to undergo a progressive deformation in response to a progressively increasing effort exerted by an
10 inner portion of the buccal cavity of the infant and electric contact elements (19a; 26) arranged for closing or opening an electric circuit when said deformable member has performed said progressive deformation, said response device being activated by
15 said circuit and being able to provide a light, sound taste or smell emission perceptible by the infant.
2. Artificial nursing nipple according to claim 1, wherein said activating member (19a) is a bar portion resiliently flexible, having one end secured to
20 said base (12) and another end freely engaging an outer portion (18) of the teat portion (18, 19) said outer portion (18) being itself deformable.
3. Artificial nursing nipple according to claim 2, wherein said bar being made of successive rigid
25 portions connected together through resilient means.
4. Artificial nursing nipple according to claim 1, characterized in that said teat portion is a rigid member comprised of a disc (34) and of a straight bar (28), supported through sliding means (32) with respect
30 to the base portion (24), the said activating member being a spring (31) one end of which is secured to the bar (28) and the other to the base (24), that latter

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part and the disc being shaped to form a vestibular screen and a tongue leaning support respectively, and the said drive means (29) being arranged for turning the response arrangement (25) into the active state 5 upon sliding of the bar with respect to the base against the action of the spring (31).

5. Artificial nursing nipple according to claim 2 or 4, wherein said bar (19, 28) is provided at one end opposed to said leaning support (34) with a gripping 10 means (23;35) allowing for putting said response arrangement into the active state by hand.

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teacher stimulating
the tongue

FIG. 1

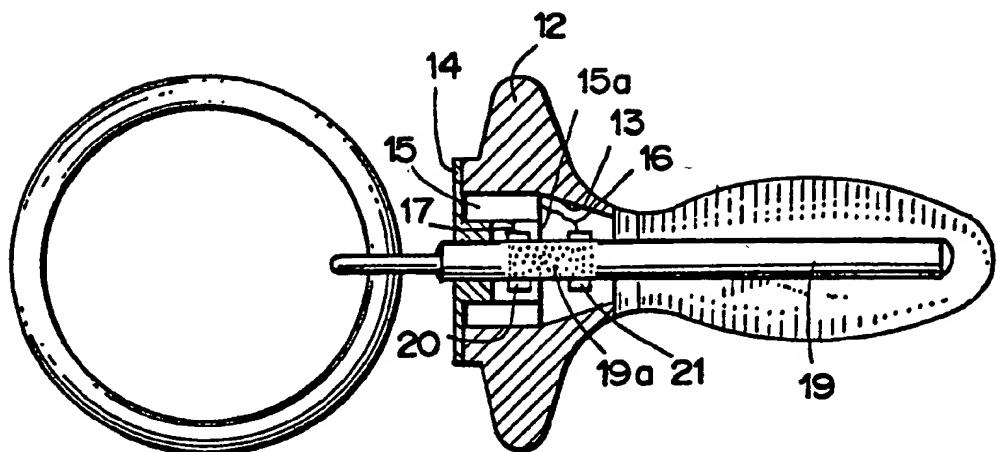
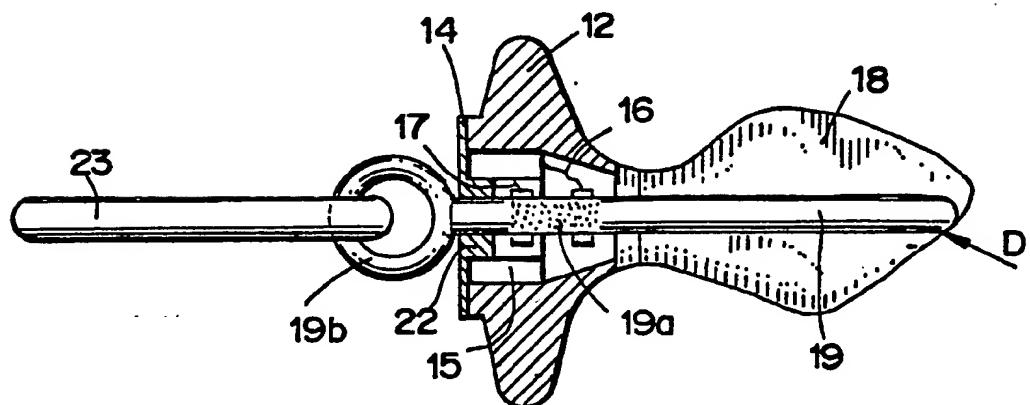


FIG. 2



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FIG. 3

